

AMENDMENTS TO THE CLAIMS

Please cancel claims 4, 6, 7 and 10-12 without prejudice or disclaimer and add new claims 13-18 as shown below. A complete listing of all pending claims is presented.

1. (Currently amended) A corneal surgery apparatus comprising:

an irradiation optical system having an irradiation reference axis, for irradiating a laser beam which brings about ablation of a cornea of a patient's eye onto a the cornea of a patient's eye;

a moving unit which relatively moves an the irradiation-position reference axis in two-dimensional directions orthogonal thereto of the laser beam by the irradiation optical system relative with respect to the patient's eye;

an alignment detection unit which detects positional displacement in the two-dimensional directions of the irradiation reference axis with respect to a predetermined position of the patient's eye by picking up an image of an anterior-segment of the patient's eye and processing an image signal thereof;

a movement control unit which obtains control data for the moving unit based on a detection result of the alignment detection unit; and a characteristic point detection unit, having an image pickup element for picking up an image of an anterior segment of the patient's eye, which processes an image signal from the image pickup element to detect a characteristic point in the anterior segment image;

a storage unit which stores positional information on the characteristic point when the patient's eye is placed under a predetermined reference state;

a detection unit which detects at least one of a characteristic point in the

anterior-segment and a target provided to the anterior-segment by picking up an image of the anterior-segment and processing an image signal thereof, and based on a detection result thereof, detects a duction condition inclination of a line of sight of the patient's eye with respect to the irradiation reference axis based on positional information on the characteristic point when the patient's eye is placed under a surgery state and the stored positional information on the characteristic point; and,

wherein at the movement control unit which controls the moving unit corrects the obtained control data based on a detection result of the duction detection unit.

2. (Currently amended) The corneal surgery apparatus according to claim 1, wherein the characteristic point the target provided to the anterior-segment is one selected from a plurality of marks previously provided to the patient's eye a sclera and a plurality of targets projected onto an iris.

3. (Currently amended) The corneal surgery apparatus according to claim 1, wherein the characteristic point in the anterior-segment is one selected from an iris pattern and an edge of a corneal limbus of the anterior-segment.

4. (Cancelled)

5. (Currently amended) The corneal surgery apparatus according to claim-4 1, further comprising an irradiation control unit which controls laser irradiation based on whether at least one of the respective detection results of the alignment detection unit and the duction detection unit is in a predetermined allowable range of its own.

6. (Cancelled)

7. (Cancelled)

8. (Currently amended) A corneal surgery apparatus comprising:

an irradiation optical system having an irradiation reference axis, for irradiating a laser beam which brings about ablation of a cornea of a patient's eye onto a the cornea of a patient's eye;

a moving unit means which moves for relatively moving an the irradiation position reference axis in two-dimensional directions orthogonal thereto of the laser beam by the irradiation optical system relative with respect to the patient's eye;

an alignment detection unit means which detects for detecting an alignment condition positional displacement in the two-dimensional directions of the irradiation position reference axis with respect to a predetermined position of the patient's eye by picking up an image of an anterior-segment of the patient's eye and processing an image signal thereof;

movement control means for obtaining control data for the moving means based on a detection result of the alignment detection means;

a duction detection unit means which detects for detecting at least one of a characteristic point in the anterior-segment and a target provided to the anterior-segment by picking up an image of the anterior-segment and processing an image signal thereof, and based on a detection result thereof, detecting a duction condition inclination of a line of sight of the patient's eye with respect to the irradiation reference axis; and

a movement control unit correction means which controls for correcting the moving

~~unit~~ the obtained control data based on ~~a detection result of the alignment detection unit and a~~
detection result of the duction detection ~~unit~~ means.

9. (Currently amended) The corneal surgery apparatus according to claim 8, further
comprising ~~an irradiation control unit means which controls~~ for controlling laser irradiation
based on whether at least one of the respective detection results of the alignment detection
~~unit means~~ and the duction detection ~~unit~~ means is in a predetermined allowable range of its
own.

10. (Cancelled)

11. (Cancelled)

12. (Cancelled)

13. (Newly-added) The corneal surgery apparatus according to claim 8, wherein the
target provided to the anterior-segment is one selected from a plurality of marks previously
provided to a sclera and a plurality of targets projected onto an iris.

14. (Newly-added) The corneal surgery apparatus according to claim 8, wherein the
characteristic point in the anterior-segment is one selected from an iris pattern and an edge of
a corneal limbus.

15. (Newly-added) The corneal surgery apparatus according to claim 8, wherein the duction detection means includes storing means for storing information on at least one of the characteristic point in the anterior-segment and the target provided to the anterior-segment in a state where the irradiation reference axis and the line of sight of the patient's eye are made coincident before surgery, and detects the inclination of the line of sight with respect to the irradiation reference axis before and during the surgery by making a comparison between the information stored in the storing means and the detection result.

16. (Newly-added) The corneal surgery apparatus according to claim 8, wherein the alignment detection means detects the positional displacement in the two-dimensional directions of the irradiation reference axis with respect to a pupil center position of the patient's eye.

17. (Newly-added) The corneal surgery apparatus according to claim 1, wherein the duction detection unit includes a storing unit which stores information on at least one of the characteristic point in the anterior-segment and the target provided to the anterior-segment in a state where the irradiation reference axis and the line of sight of the patient's eye are made coincident before surgery, and detects the inclination of the line of sight with respect to the irradiation reference axis before and during the surgery by making a comparison between the information stored in the storing unit and the detection result.

18. (Newly-added) The corneal surgery apparatus according to claim 1, wherein the alignment detection unit detects the positional displacement in the two-dimensional directions of the irradiation reference axis with respect to a pupil center position of the patient's eye.